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EXAMINER	
CHAU, COREY P	

ART UNIT	PAPER NUMBER
2644	

DATE MAILED: 07/29/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/393,463	WOODS, WILLIAM S.	
	Examiner	Art Unit	
	Corey P. Chau	2644	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 December 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-50* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *24-39,41-45 and 47-50* is/are allowed.

6)☐ Claim(s) *1-23 and 40* is/are rejected.

7)☒ Claim(s) *46* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *11/18/03*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Double Patenting

1. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970);and, *In re Thorington,* 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

2. Claims 1-50 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-49 of copending Application No. 10/731915. Although the conflicting claims are not identical, they are not patentably distinct from each other because the instant Claims 1-50 falls entirely within the scope of Claims 1-49 of Application No.

10/731915 or, in other words the instant Claims 1-50 are obvious over Claims 1-49 of Application No. 10/731915. The instant Claims 1-50 is a broader version of Claims 1-49 of Application No. 10/731915 and is therefore obvious of Claims 1-49 of Application No. 10/731915

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

4. Claims 1, 2, and 8 are rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent No. 6353671 to Kandel (hereafter as Kandel).

5. Regarding Claim 1, Kandel discloses a method of processing audio signals (i.e. signal processing circuit and method for increasing speech intelligibility), comprising inhibiting at least one feedback component of an input audio signal by adjusting a feedback-inhibiting filter (Fig. 4; column 5, line 57 to column 6, line 5; column 9, lines 50-57) using a narrowband subaudible probe signal (Fig. 4; column 6, lines 19-24; column 10, lines 12-25; column 12, lines 1-4).

6. Regarding Claim 2, Kandel discloses a method of processing at least one audio signal (i.e. signal processing circuit and method for increasing speech intelligibility) comprising: filtering a processed signal by a notch filter to form a filtered signal (Fig. 4; column 10, lines 12-25; column 11, lines 5-11); and sending a subaudible narrowband signal having a first bandwidth into the filter signal to form a probe signal to probe a feedback path having a second bandwidth (Fig. 4; column 6, lines 19-24; column 10, lines 12-25; column 12, lines 1-4).

7. Regarding Claim 8, Kandel discloses a system for enhancing audio signals, the system (i.e. signal processing circuit and method for increasing speech intelligibility) comprising: at least one detector to detect undesired feedback in an input signal (Fig. 4; column 9, lines 41-57); at least one notch filter to filter a processed signal (Fig. 4; column 10, lines 12-25; column 11, lines 5-11); wherein the at least one notch filter provides a filtered signal and the processed signal is provided by processing the input signal (Fig. 4); and at least one probe generator to generate a probe signal and the filtered signal used to

probe a feedback path with a narrowband subaudible audio probe signal (Fig. 4; column 6, lines 19-24; column 10, lines 12-25; column 12, lines 1-4).

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. Claims 1, 2, 5, 6, and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5259033 to Goodings et al (hereafter as Goodings) in view of U.S. Patent No. 6097823 to Kuo.

10. Regarding Claim 1, Goodings discloses a method of processing audio signals (i.e. hearing aid having compensation for acoustic feedback), comprising inhibiting at least one feedback component of an input audio signal by adjusting a feedback-inhibiting filter (27) using a subaudible probe signal (33) (i.e. noise signal having a flat spectral characteristic over a more limited range converging the expected range of oscillation frequencies normally would be adequate) (Fig. 1; column 7, lines 3-28; column 8, lines 29-33). Goodings discloses a subaudible probe signal is injected into the system, but it would have been obvious to one having ordinary skill in the art to use any equivalent probe signal that would produce the same result, as taught by Kuo. Kuo discloses a digital hearing and method of feedback path modeling comprising a modeling signal generator (i.e.

probe generator), wherein the modeling signal generator may use any number of techniques to generate the modeling signal. Modeling signal generator may generate a white-noise signal, a random signal, a chirp signal or virtually any type of signal capable of serving as a modeling signal to excite an environment or path (column 6, lines 10-24 and lines 48-60). It would have been obvious to one having ordinary skill in the art at the time the invention was made to employ any know techniques to generate a probe signal (i.e. modeling signal). Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize a generator that generates a chirp signal (i.e. a chirp signal is an equivalent probe signal wherein at an instantaneous moment it is a narrow band signal) to inject into the system as a probe signal.

11. Regarding Claim 2, Goodings discloses a method of processing at least one audio signal (i.e. hearing aid having compensation for acoustic feedback) comprising: filtering a processed signal by a notch filter to form a filtered signal (i.e. the adaptive filter models the path and then takes the inverse of the modeled signal, this functions as a notch filter); and sending a signal (i.e. probe signal) having a first bandwidth into the filter signal to form a probe signal to probe a feedback path having a second bandwidth (i.e. noise signal having a flat spectral characteristic over a more limited range converging the expected range of oscillation frequencies normally would be adequate) (Fig. 1; column 7, lines 3-28; column 8, lines 29-33). Goodings discloses a subaudible probe signal is injected into the system, but it would have been obvious to one having ordinary skill in the art to use any equivalent probe signal that would produce the same result, as

taught by Kuo. Kuo discloses a digital hearing and method of feedback path modeling comprising a modeling signal generator (i.e. probe generator), wherein the modeling signal generator may use any number of techniques to generate the modeling signal. Modeling signal generator may generate a white-noise signal, a random signal, a chirp signal or virtually any type of signal capable of serving as a modeling signal to excite an environment or path (column 6, lines 10-24 and lines 48-60). It would have been obvious to one having ordinary skill in the art at the time the invention was made to employ any know techniques to generate a probe signal (i.e. modeling signal). Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize a generator that generates a chirp signal (i.e. a chirp signal is an equivalent probe signal wherein at an instantaneous moment it is a narrow band signal) to inject into the system as a probe signal.

12. Regarding Claim 5, Goodings as modified discloses sending the subaudible narrowband signal comprises sending the subaudible narrowband signal having a level, wherein the level of the subaudible narrowband signal is determined using an audibility model (column 10, lines 61-68).

13. Regarding Claim 6, Goodings as modified discloses sending the subaudible narrowband signal comprises sending the subaudible narrowband signal at a level determined by an audibility model, wherein the audibility model has a criterion level, and wherein the level of the subaudible narrowband signal is adjusted so as to be about the criterion level of the audibility model (column 10, line 61 to column 11, line 12).

14. Regarding Claim 7, Goodings as modified discloses wherein sending the subaudible narrowband signal comprises sending the subaudible narrowband signal at a level determined by an audibility model, wherein the audibility model has a criterion level, and wherein the level of the subaudible narrowband signal is adjusted so as to be about below the criterion level of the audibility model (column 10, line 61 to column 11, line 12).

15. Claims 8, 14, 16, 17, 19, 20 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5259033 to Goodings in view of U.S. Patent No. 6097823 to Kuo as applied to claims 1, 2, 5, 6, and 7 above, and further in view of "Feedback Cancellation in Hearing Aids: Results from a Computer Simulation", by Kates.

16. Regarding Claim 8, Goodings discloses a system for enhancing audio signal (i.e. hearing aid having compensation for acoustic feedback) comprising: at least one notch filter to filter a processed signal (i.e. the adaptive filter models the path and then takes the inverse of the modeled signal, this functions as a notch filter) and at least one probe generator to generate a probe signal (i.e. noise signal having a flat spectral characteristic over a more limited range converging the expected range of oscillation frequencies normally would be adequate) (Fig. 1; column 7, lines 3-28; column 8, lines 29-33). Goodings discloses a subaudible probe signal is injected into the system, but it would have been obvious to one having ordinary skill in the art to use any equivalent probe signal that would produce the same result, as taught by Kuo. Kuo discloses a

digital hearing and method of feedback path modeling comprising a modeling signal generator (i.e. probe generator), wherein the modeling signal generator may use any number of techniques to generate the modeling signal. Modeling signal generator may generate a white-noise signal, a random signal, a chirp signal or virtually any type of signal capable of serving as a modeling signal to excite an environment or path (column 6, lines 10-24 and lines 48-60). It would have been obvious to one having ordinary skill in the art at the time the invention was made to employ any know techniques to generate a probe signal (i.e. modeling signal). Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize a generator that generates a chirp signal (i.e. a chirp signal is an equivalent probe signal wherein at an instantaneous moment it is a narrow band signal) to inject into the system as a probe signal. Goodings as modified does not expressly disclose a detector to detect undesired feedback in an input signal. Kates discloses a feedback detection to determine if a sinusoid has power above a preset threshold is present at the microphone (i.e. input signal) and if so, the normal hearing aid processing is disengaged and a noise is used as a probe sequence is injected into the system. Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Goodings as modified with the teaching of Kates to incorporate a feedback detector to provide detection of a input signal above a threshold and if the input signal is above the threshold, the hearing aid is disengage and noise is injected into the system.

17. Regarding Claim 14, Goodings as modified discloses the at least one probe generator has a first bandwidth, wherein the feedback path has a second bandwidth, and wherein the at least one probe generator is configured so as to center the first bandwidth of the at least one probe generator on the second bandwidth of the feedback path (Fig. 3, lines 17-48).

18. Regarding Claim 16, Goodings as modified discloses a combiner (21) to provide a combined signal, wherein the combiner combines the filtered signal of the at least one notch filter and the probe signal of the at least one probe generator.

19. Regarding Claim 17, Goodings as modified discloses a signal processor to provide the processed signal (7).

20. Regarding Claim 19, Goodings as modified does not expressly disclose a switch to provide an output signal, wherein the switch is receptive to the processed signal and a combined signal, wherein the combined signal includes a combination of the probe signal and the filtered signal. Kates discloses switching off the normal hearing-aid processing interrupts the feedback loop during the estimation of the feedback path. This can greatly improve the signal-to-noise ratio during the estimation since the feedback oscillations are eliminated (Fig. 4; column 2, paragraph 3). Therefore it would have been obvious to one having ordinary skill in the art to modify Goodings with the teaching of Kates to utilize a switch between the noise generator and adder 21 (Fig. 3) in order to switch off the normal hearing-aid processing interrupts the feedback loop during the estimation of the feedback path, which improves the signal-to-noise ratio during

the estimation since the feedback oscillations are eliminated. Therefore Goodings as modified discloses a switch to provide an output signal, wherein the switch is receptive to the processed signal and a combined signal, wherein the combined signal includes a combination of the probe signal and the filtered signal (Fig. 3)

21. Regarding Claim 20, Goodings as modified discloses a filter adjust a filter by providing a set of filter coefficients (Figs. 1 and 3; column 8, line 41 to column 9, line 25).

22. All element of Claim 21 are comprehended by Claim 8. Claim 21 is rejected for the reasons stated above apropos to Claim 8 (Fig. 3).

23. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5259033 to Goodings in view of U.S. Patent No. 6097823 to Kuo as applied to claims 1, 2, 5, 6, and 7 above, and further in view of "Feedback Cancellation in Hearing Aids: Results from a Computer Simulation", by Kates, and U.S. Patent No. 4088835 to Thurmond et al. (hereafter as Thurmond).

24. Regarding Claim 18, Goodings as modified discloses the signal processor, but only generally; no specific hardware or software is taught. Therefore it would have been obvious to one having ordinary skill in the art to seek known signal processor. Thurmond for example, discloses a compressor (i.e. compressive amplifier), which is a device well known for reducing the dynamic range of the signal which passes through it thereby limiting the maximum signal to a predetermined safe level without clipping (column 3 lines 59-68). It would have

been obvious to one having ordinary skill in the art to employ any know signal processor, such as that of Thurmond. Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the compressor of Thurmond.

25. Claims 1, 2, 3, 4, 8, 9, 10, 20, 22, 23, and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over "Feedback Cancellation in Hearing Aids: Results from a Computer Simulation", by Kates in view of U.S. Patent No. 6097823 to Kuo.

26. Regarding Claim 1, Kates discloses a method of processing audio signals (i.e. feedback cancellation in hearing aids), comprising inhibiting at least one feedback component of an input audio signal by adjusting a feedback-inhibiting filter using a probe signal (i.e. pseudorandom noise burst)(Fig. 4). Kates discloses a pseudorandom noise burst is injected into the system as a probe signal (Fig. 4; column 1, paragraph 3; column 5, paragraph 2), but it would have been obvious to one having ordinary skill in the art to use any equivalent probe signal that would produce the same result, as taught by Kuo. Kuo discloses a digital hearing and method of feedback path modeling comprising a modeling signal generator (i.e. probe generator), wherein the modeling signal generator may use any number of techniques to generate the modeling signal. Modeling signal generator may generate a white-noise signal, a random signal, a chirp signal or virtually any type of signal capable of serving as a modeling signal to excite an environment or path (column 6, lines 10-24 and lines 48-60). It would

have been obvious to one having ordinary skill in the art at the time the invention was made to employ any know techniques to generate a probe signal (i.e. modeling signal). Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize a generator that generates a chirp signal (i.e. a chirp signal is an equivalent probe signal wherein at an instantaneous moment it is a narrow band signal) to inject into the system as a probe signal.

27. Regarding Claim 2, Kates discloses a method of processing at least one audio signal (i.e. feedback cancellation in hearing aids) comprising: filtering a processed signal by a notch filter to form a filtered signal (i.e. the adaptive filter models the path and then takes the inverse of the modeled signal, this functions as a notch filter); and sending a signal (i.e. probe signal) having a first bandwidth into the filter signal to form a probe signal to probe a feedback path having a second bandwidth. Kates discloses a pseudorandom noise burst is injected into the system as a probe signal (Fig. 4; column 1, paragraph 3; column 5, paragraph 2), but it would have been obvious to one having ordinary skill in the art to use any equivalent probe signal that would produce the same result, as taught by Kuo. Kuo discloses a digital hearing and method of feedback path modeling comprising a modeling signal generator (i.e. probe generator), wherein the modeling signal generator may use any number of techniques to generate the modeling signal. Modeling signal generator may generate a white-noise signal, a random signal, a chirp signal or virtually any type of signal capable of serving as a modeling signal to excite an environment or path (column 6, lines

10-24 and lines 48-60). It would have been obvious to one having ordinary skill in the art at the time the invention was made to employ any know techniques to generate a probe signal (i.e. modeling signal). Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize a generator that generates a chirp signal (i.e. a chirp signal at an instant is a narrow band signal) to inject into the system as a probe signal.

28. Regarding Claim 3, Kates as modified discloses comparing the probe signal to an input signal; and adjusting selectively an inhibiting filter so as to inhibit at least one audio artifact associated with the feedback path (i.e. for the LMS adaptive filter coefficient computation, the amplified noise probe sequence is the reference input to the adaptive filter and the difference between the microphone signal and the filtered probe sequence is the error input. The Wiener filter, uses the cross correlation of the amplified pseudorandom noise sequence and the microphone signal to estimate the filter coefficients) (Fig. 4; column 6, paragraph 1).

29. Regarding Claim 4, Kates as modified discloses turning off selectively the operation of the notch filter when the inhibiting filter is adjusted (Fig. 4; column 9, paragraph 5).

30. Regarding Claim 8, Kates discloses a system for enhancing audio signal comprising: at least one detector (i.e. feedback detection) to detect undesired feedback in an input signal; at least one notch filter to filter a processed signal (i.e. the adaptive filter models the path and then takes the inverse of the modeled signal, this functions as a notch filter) and at least one probe generator to

generate a probe signal. Kates discloses a pseudorandom noise burst is injected into the system as a probe signal (Fig. 4; column 1, paragraph 3; column 5, paragraph 2), but it would have been obvious to one having ordinary skill in the art to use any equivalent probe signal that would produce the same result, as taught by Kuo. Kuo discloses a digital hearing and method of feedback path modeling comprising a modeling signal generator (i.e. probe generator), wherein the modeling signal generator may use any number of techniques to generate the modeling signal. Modeling signal generator may generate a white-noise signal, a random signal, a chirp signal or virtually any type of signal capable of serving as a modeling signal to excite an environment or path (column 6, lines 10-24 and lines 48-60). It would have been obvious to one having ordinary skill in the art at the time the invention was made to employ any know techniques to generate a probe signal (i.e. modeling signal). Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize a generator that generates a chirp signal (i.e. a chirp signal at an instant is a narrow band signal) to inject into the system as a probe signal.

31. Regarding Claim 9, Kates as modified discloses the at least one detector determines when the feedback path will be probed (Fig. 4).

32. Regarding Claim 10, Kates as modified discloses the at least one detector determines a range of frequencies at which the feedback path will be probed (i.e. the detection procedure uses an adaptive notch filter. The adaptive notch filter is adapted to track the frequency of the sinusoid and the coefficients are then copied to the IIR portion of the filter)(column 7, paragraphs 1 and 2).

33. All element of Claim 20 are comprehended by Claim 2. Claim 20 is rejected for the reasons stated above apropos to Claim 2 (column 6, paragraphs 1 and 2).

34. Regarding Claim 22, Kates as modified discloses an inhibiting filter receptive to the set of filter coefficients from the filter adjuster to inhibit at least one feedback component of the input signal (Fig. 4; column 5, paragraph 1; column 6, paragraph 1).

35. Regarding Claim 23, Kates as modified discloses the inhibiting filter approximates the response of the feedback path to provide at least one feedback component signal, wherein the at least one feedback component signal is subtracted from the input signal (Fig. 4).

36. Regarding Claim 40, Kates as modified discloses a filter adjuster to adjust an inhibiting filter to inhibit the undesired feedback by providing a set of filter coefficients, the filter adjuster comprising: a modeler (i.e. LMS adaptive filter or Wiener filter) receptive to a feedback indicator parameter (i.e. it is obvious that the LMS adaptive filter or Wiener filter receive a feedback parameter in order to generate coefficients), the input signal, and an output signal to model at least one response of the feedback path when the feedback path is probed with the narrowband subaudible audio probe signal at a predetermined frequency, wherein the modeler provides at least one sample that is representative of the at least one response of the feedback path (Fig. 4).

37. Claims 2, 8, 11, 12, 13, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6496581 to Finn et al (hereafter as Finn) in view of U.S. Patent No. 5259033 to Goodings, and further in view of U.S. Patent No. 6097823 to Kuo.

38. Regarding Claim 2, Finn discloses a method of processing at least one audio signal (i.e. feedback suppression) comprising filtering a processed signal by a notch filter to form a filtered signal (i.e. a sine wave or multiple sine waves can be generated from the detected feedback frequency and serve as the reference to the electronic noise control filter. The ENC filter will form notches at the exact frequencies, and adjust its attenuation until the offending feedback tones are minimized to the level of the noise floor) (Fig. 7; column 15, lines 4-16). Finn does not expressly disclose a probe signal to probe a feedback path. Goodings discloses a hearing aid having compensation for acoustic feedback comprising a noise generator to inject noise into the system in order to adapt a filter to produce an exact replica of an electrical signal corresponding to the acoustic feedback, the noise signal N, after attenuation (column 6, line 61 to column 7, line 28. Gooding discloses that the noise signal having a flat spectral characteristic over a more limited range converging the expected range of oscillation frequencies normally would be adequate (Fig. 1; column 7, lines 3-28; column 8, lines 29-33). Goodings discloses a subaudible probe signal is injected into the system, but it would have been obvious to one having ordinary skill in the art to use any equivalent probe signal that would produce the same result, as taught by Kuo. Kuo discloses a digital hearing and method of feedback path

modeling comprising a modeling signal generator (i.e. probe generator), wherein the modeling signal generator may use any number of techniques to generate the modeling signal. Modeling signal generator may generate a white-noise signal, a random signal, a chirp signal or virtually any type of signal capable of serving as a modeling signal to excite an environment or path (column 6, lines 10-24 and lines 48-60). It would have been obvious to one having ordinary skill in the art at the time the invention was made to employ any know techniques to generate a probe signal (i.e. modeling signal). Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize a generator that generates a chirp signal (i.e. a chirp signal is an equivalent probe signal wherein at an instantaneous moment it is a narrow band signal) to inject into the system as a probe signal. Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Finn with the teaching of Gooding as modified to incorporate a noise generator to inject noise into the system in order to adapt a filter to produce an exact replica of an electrical signal corresponding to the acoustic feedback, the noise signal N, after attenuation.

39. Regarding Claim 8, Finn discloses a system for enhancing audio signal (i.e. feedback suppression), wherein a sine wave or multiple sine waves can be generated from the detected feedback frequency (i.e. at least one detector) and serve as the reference to the electronic noise control filter. The ENC filter will form notches at the exact frequencies (i.e. notch filter), and adjust its attenuation until the offending feedback tones are minimized to the level of the noise floor

(Fig. 7; column 15, lines 4-16). Finn does not expressly disclose a probe signal to probe a feedback path. Goodings discloses a hearing aid having compensation for acoustic feedback comprising a noise generator to inject noise into the system in order to adapt a filter to produce an exact replica of an electrical signal corresponding to the acoustic feedback, the noise signal N, after attenuation (column 6, line 61 to column 7, line 28. Gooding discloses that the noise signal having a flat spectral characteristic over a more limited range converging the expected range of oscillation frequencies normally would be adequate (i.e. since the signal is not wideband, it is obvious that it is narrowband) (Fig. 1; column 7, lines 3-28; column 8, lines 29-33). Goodings discloses a subaudible probe signal is injected into the system, but it would have been obvious to one having ordinary skill in the art to use any equivalent probe signal that would produce the same result, as taught by Kuo. Kuo discloses a digital hearing and method of feedback path modeling comprising a modeling signal generator (i.e. probe generator), wherein the modeling signal generator may use any number of techniques to generate the modeling signal. Modeling signal generator may generate a white-noise signal, a random signal, a chirp signal or virtually any type of signal capable of serving as a modeling signal to excite an environment or path (column 6, lines 10-24 and lines 48-60). It would have been obvious to one having ordinary skill in the art at the time the invention was made to employ any know techniques to generate a probe signal (i.e. modeling signal). Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize a generator that generates a chirp signal (i.e. a chirp signal is

an equivalent probe signal wherein at an instantaneous moment it is a narrow band signal) to inject into the system as a probe signal. Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Finn with the teaching of Gooding as modified to incorporate a noise generator to inject noise into the system in order to adapt a filter to produce an exact replica of an electrical signal corresponding to the acoustic feedback, the noise signal N, after attenuation.

40. Regarding Claim 11, Finn discloses the at least one detector provides a feedback parameter, and wherein the at least one notch filter is receptive to the feedback parameter from the at least one detector (Fig 7).

41. Regarding Claim 12, Finn does not expressly discloses the at least one detector provides a plurality of feedback parameters, and wherein the at least one notch filter is receptive to the plurality of feedback parameters from the at least one detector. However it would have been obvious to one having ordinary skill in the art at the time the invention was made to have the at least one detector provides a plurality of feedback parameters and the at least one notch filter is receptive to the plurality of feedback parameters from the at least one detector in order to provide a more efficient feedback cancellation system.

42. Regarding Claim 13, Finn discloses the at least one notch filter has a first bandwidth, wherein the undesired feedback has a second bandwidth, and wherein the at least one notch filter is configured so as to center the first bandwidth of the at least one notch filter on the second bandwidth of the undesired feedback (i.e. it is inherent that a notch filter is configured so as to

center the first bandwidth of the at least one notch filter on the second bandwidth of the undesired feedback in order to attenuate the undesired noise)(Fig. 7; column 15, lines 4-16).

43. All element of Claim 15 are comprehended by Claim 8. Claim 15 is rejected for the reasons stated above apropos to Claim 8.

Allowable Subject Matter

44. Claim 46 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

45. Claims 24-39, 41-45, and 47-50 are allowable if Applicant overcomes the Double Patenting rejection set forth in this Office Action.

Response to Arguments

46. Applicant's arguments filed 12/27/2004 have been fully considered but they are not persuasive.

47. With respect to Applicant's argument on pages 14 and 15, stating that "Applicant submits that a narrowband signal narrowband signal is different from an instantaneous moment of a chirp signal. Additional features must be applied to the chirp signal to use the instantaneous moment of a chirp signal as a narrowband signal, such as processing the chirp signal to obtain the instantaneous moment as a narrowband signal for use as a probe signal", has

been noted. However the Examiner respectfully disagrees. Applicant has not clearly defined a "narrowband subaudible probe signal" in the claim, which can be interpret as many things such as a subaudible probe signal comprises multiple instantaneous moment of a chirp signal, wherein the instantaneous moment of a chirp signal is a short, high-pitch sound, which reads on a "narrowband signal", therefore providing a "narrowband subaudible probe signal" as discloses by Goodings as modified, Kates as modified, and Finn as modified.

Conclusion

48. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Corey P. Chau whose telephone number is (571)272-7514. The examiner can normally be reached on Monday - Friday 9:00 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chin Vivian can be reached on (571)272-7848. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

VIVIAN CHIN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600

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July 25, 2005